Antidegradation Examples Using the Existing Rules for the Great Lakes Basin

New Industrial Discharger

A new manufacturing facility will have the following pollutants in their discharge: Copper, Lead, Nickel, TCE and Zinc.

Discharger Design Flow = 2.0 MGD
Stream Design Flow = 56.0 MGD

The pollutants that will receive effluent limits based on the reasonable potential to exceed a WQBEL are: Copper and Zinc. The other pollutants do not have a reasonable potential to exceed the WQBEL. Only the pollutants that have a reasonable potential to exceed the WQBEL or that have a TBEL will be included in the antidegradation review.

	Projected Effluent Quality (PEQ)			Preliminary Effluent Limits (PEL)		
	Monthly	Daily		Monthly	Daily	
Parameter	Average	Maximum	Units	Average	Maximum	Units
Copper	62.0	62.0	ug/l	34.0	69.0	ug/l
Lead	120.0	120.0	ug/l	140.0	282.0	ug/l
Nickel	490.0	490.0	ug/l	780.0	1560.0	ug/l
Zinc	285.0	285.0	ug/l	270.0	550.0	ug/l
TCE	19.0	19.0	ug/l	393.0	790.0	ug/l

The effluent limits based on technology (federal effluent guidelines or BPJ/BAT) are:

	Quantity or Loading			Quality or Concentration			
	Monthly	Daily		Monthly	Daily		
Parameter	Average	Maximum	Units	Average	Maximum	Units	Basis
Copper	1.6	3.2	lbs/day	N.A.	N.A.	ug/l	ELG
Lead	2.1	4.2	lbs/day	N.A.	N.A.	ug/l	ELG
Nickel	5.3	10.6	lbs/day	N.A.	N.A.	ug/l	ELG
Zinc	8.4	16.8	lbs/day	N.A.	N.A.	ug/l	ELG
TCE	N.A.	0.083	lbs/day	N.A.	5.0	ug/l	BPJ/BAT

The effluent limits based on the De minimis Lowering of Water Quality are:

	Quantity or Loading			Quality or Concentration			
	Monthly	Daily		Monthly	Daily		
Parameter	Average	Maximum	Units	Average	Maximum	Units	Basis
Copper	0.47	0.94	lbs/day	28.0	56.6	ug/l	WQBEL
Lead	0.51	1.03	lbs/day	30.8	61.7	ug/l	WQBEL
Nickel	2.87	5.74	lbs/day	172.0	344.0	ug/l	WQBEL
Zinc	4.2	8.5	lbs/day	250.0	510.0	ug/l	WQBEL
TCE	N.A.	0.083	lbs/day	N.A.	5.0	ug/l	DTBEL

If the discharger agrees to accept effluent limits that are less than or equal to the limits based on the De minimis Lowering of Water Quality, the discharge will not be considered to be a significant lowering of water quality and no further antidegradation action will be required.

If the discharger wants or needs to discharge any of these substances at a level that is greater than the limits based on the De minimis, then they must submit an antidegradation demonstration unless the activity causing the new or increased discharge is considered by rule to not be a significant lowering of water quality. If the activity causing the new or increased discharge is considered by rule to not be a significant lowering of water quality, then they must demonstrate that it meets one of the exemptions.

Since this is the first antidegradation demonstration or de minimis evaluation in the area of the discharge, the representative background concentration established at this time will be the benchmark for any future antidegradation reviews. The representative background concentration for the pollutants are as follows:

Copper – 2.7 ug/l
Lead – 1.6 ug/l
Nickel – 2.7 ug/l
Zinc – 8.3 ug/l
TCE – 0.0 ug/l

The Benchmark Unused Loading Capacity is:

Copper – 14.8 lbs/day
Lead – 130.8 lbs/day
Nickel – 508.1 lbs/day
Zinc – 123.5 lbs/day
TCE – 224.2 lbs/day

Existing Industrial Discharger

An existing manufacturing facility has the following pollutants in their discharge: Copper, Lead, Nickel, TCE and Zinc.

Discharger Design Flow = 2.0 MGD
Stream Design Flow = 56.0 MGD

Their existing permit limits are:

	Quantity or Loading			Quality or Concentration			
Parameter	Monthly Average	Daily Maximum	Units	Monthly Average	Daily Maximum	Units	Basis
Copper	0.57	1.15	lbs/day	34.0	69.0	ug/l	WQBEL
Lead	2.33	4.7	lbs/day	140.0	282.0	ug/l	WQBEL
Nickel	10.6	21.2	lbs/day	N.A.	N.A.	ug/l	TBEL
Zinc	6.6	13.2	lbs/day	393.0	790.0	ug/l	WQBEL
TCE	N.A.	0.083	lbs/day	N.A.	5.0	ug/l	TBEL

The discharger proposes to double their existing operations and their discharge flow from 2 MGD to 4 MGD.

The pollutants that will receive limits based on the reasonable potential to exceed a WQBEL are: Copper, Lead, Nickel and Zinc. TCE does not have a reasonable potential to exceed the WQBEL.

	Projected Effluent Quality (PEQ)			Preliminary Effluent Limits (PEL)		
Parameter	Monthly Average	Daily Maximum	Units	Monthly Average	Daily Maximum	Units
Copper	62.0	62.0	ug/l	34.0	69.0	ug/l
Lead	120.0	120.0	ug/l	80.0	160.0	ug/l
Nickel	490.0	490.0	ug/l	440.0	880.0	ug/l
Zinc	285.0	285.0	ug/l	270.0	550.0	ug/l
TCE	19.0	19.0	ug/l	221.0	440.0	ug/l

The effluent limits based on technology are:

	Quantity or Loading			Quality or Concentration		
Parameter	Monthly Average	Daily Maximum	Units	Monthly Average	Daily Maximum	Units
Copper	3.2	6.4	lbs/day	N.A.	N.A.	ug/l
Lead	4.2	8.4	lbs/day	N.A.	N.A.	ug/l
Nickel	10.6	21.2	lbs/day	N.A.	N.A.	ug/l
Zinc	16.8	33.6	lbs/day	N.A.	N.A.	ug/l
TCE	N.A.	0.167	lbs/day	N.A.	5.0	ug/l

The effluent limits for the increase based on the De minimis Lowering of Water Quality are:

	Quantity or Loading			Quality or Concentration			
Parameter	Monthly Average	Daily Maximum	Units	Monthly Average	Daily Maximum	Units	Basis
Copper	0.46	0.93	lbs/day	28.0	56.6	ug/l	WQBEL
Lead	0.51	1.03	lbs/day	30.8	61.7	ug/l	WQBEL
Nickel	2.87	5.74	lbs/day	172.0	344.0	ug/l	WQBEL
Zinc	4.17	8.5	lbs/day	250.0	510.0	ug/l	WQBEL
TCE	N.A.	0.083	lbs/day	N.A.	5.0	ug/l	DTBEL

The Effluent limits in the final permit are:

Quantity or Loading			Quality or Concentration				
Parameter	Monthly Average	Daily Maximum	Units	Monthly Average	Daily Maximum	Units	Basis
Copper	1.03	2.08	lbs/day	31.0	62.4	ug/l	Existing + WQBEL
Lead	2.84	5.7	lbs/day	84.0	171.0	ug/l	Existing + WQBEL
Nickel	13.5	26.9	lbs/day	405.0	806.0	ug/l	Existing + WQBEL
Zinc	10.8	21.7	lbs/day	321.0	650.0	ug/l	Existing + WQBEL
TCE	N.A.	0.167	lbs/day	N.A.	5.0	ug/l	Existing + DTBEL

If the discharger agrees to accept effluent limits that are less than or equal to these limits, the discharge will not be considered to be a significant lowering of water quality and no further action will be required.

If the discharger wants or needs to discharge any of these substances at a level that is greater than the limits based on the De minimis, then they must submit an antidegradation demonstration unless the activity causing the new or increased discharge is considered by rule to not be a significant lowering of water quality. If the activity causing the new or increased discharge is considered by rule to not be a significant lowering of water quality, then they must demonstrate that through an exemption justification.

The representative background concentrations at the time of this request are:

Copper – 2.9 ug/l = 7.4% Increase
Lead – 1.7 ug/l = 6.3 % Increase
Nickel – 2.8 ug/l = 3.7 % Increase
Zinc – 8.7 ug/l = 4.8% Increase
TCE – 0.0 ug/l = 0.0% Increase

The New Unused Loading Capacity is:

Copper – 14.7 lbs/day
Lead – 130.5 lbs/day
Nickel – 507.0 lbs/day
Zinc – 123.3 lbs/day
TCE – 224.2 lbs/day

The decrease in the unused loading capacity at the time of the request is equal to the Benchmark Unused Loading Capacity – New Unused Loading Capacity.

The Benchmark Unused Loading Capacity = Total Loading Capacity – Benchmark Used Loading Capacity.

The New Unused Loading Capacity = Total Loading Capacity – New Used Loading Capacity.

The Used Loading Capacity is based on the representative background concentration established at the time of the request and the stream design flow.

The decrease in the unused loading capacity is:

Copper = 14.8 lbs/day – 14.7 lbs/day = 0.1 lbs/day = 0.7 %
Lead – 130.8 lbs/day – 130.5 lbs/day = 0.3 lbs/day = 0.2 %
Nickel – 508.1 lbs/day – 507.0 lbs/day = 1.1 lbs/day = 0.2 %
Zinc – 123.5 lbs/day – 123.3 lbs/day = 0.2 lbs/day = 0.16%
TCE – 224.2 lbs/day – 224.2 lbs/day = 0.0 lbs/day = 0.0 %

New Sanitary Discharger

A new Regional Sewer District has been formed to treat wastewater from two small towns that have been on septic systems. The RSD is building a new 0.5 MGD extended aeration treatment system to treat the wastewater from the two small towns. The receiving stream has a design flow of 1 MGD.

The need to have effluent limits for ammonia as N are based on the reasonable potential to exceed the WQBELs. The WQBELs are as follows:

	Quantity or Loading			Quality or Concentration		
Parameter	Monthly Average	Daily Maximum	Units	Monthly Average	Weekly Average	Units
Ammonia as N						
Summer	9.2	20.9	lbs/day	2.2	5.0	mg/l
Winter	9.6	20.9	lbs/day	2.3	5.0	mg/l

The effluent limits necessary for meeting the De minimis Lowering of Water Quality based on the DTBEL for ammonia as N are as follows:

Quantity or Loading			Quality or Concentration			
Parameter	Monthly Average	Daily Maximum	Units	Monthly Average	Weekly Average	Units
Ammonia as N	4.6	6.9	lbs/day	1.1	1.65	mg/l

The effluent limits for Ammonia as N, Total Suspended Solids, CBOD, and Phosphorus are based on the DTBEL are:

	Quantity or Loading			Quality or Concentration		
Parameter	Monthly Average	Daily Maximum	Units	Monthly Average	Weekly Average	Units
$CBOD_5$	41.7	62.6	lbs/day	10.0	15.0	mg/l
TSS	41.7	62.6	lbs/day	10.0	15.0	mg/l
Phosphorus	4.2	--------	lbs/day	1.0	-------	mg/l
Ammonia as N	4.6	6.9	lbs/day	1.1	1.65	mg/l

The final effluent limits to meet the De minimis are:

	Quantity or Loading			Quality or Concentration		
Parameter	Monthly Average	Daily Maximum	Units	Monthly Average	Weekly Average	Units
$CBOD_5$	104.3	166.8	lbs/day	10.0	15.0	mg/l
TSS	125.1	187.7	lbs/day	10.0	15.0	mg/l
Ammonia as N	4.6	6.9	lbs/day	1.1	1.65	mg/l
Phosphorus	4.2	--------	lbs/day	1.0	-------	mg/l

If the discharger agrees to accept effluent limits that are less than or equal to these limits, the discharge will not be considered to be a significant lowering of water quality and no further action will be required.

If the discharger wants or needs to discharge any of these substances at a level that is greater than the limits based on the De minimis, then they must submit an antidegradation demonstration application unless the activity causing the new or increased discharge is considered by rule to not be a significant lowering of water quality.

If the activity causing the new or increased discharge is considered by rule to not be a significant lowering of water quality, then they must submit a Non-significant lowering of water quality application.

Since this is the first antidegradation demonstration or de minimis evaluation in the area of the discharge, the representative background concentration established at this time will be the benchmark for any future antidegradation reviews.

Existing Sanitary Discharger

An existing community is expanding their existing extended aeration treatment system from 5.0 MGD to 7.0 MGD to treat the wastewater from the expansion of the population in the community. The receiving stream has a flow of 55 MGD.

Their existing effluent limits based on a design flow of 5.0 MGD are:

	Quantity or Loading			Quality or Concentration		
Parameter	Monthly Average	Daily Maximum	Units	Monthly Average	Weekly Average	Units
$CBOD_5$	1042.5	1668	lbs/day	25.0	40.0	mg/l
TSS	1251	1876.5	lbs/day	30.0	45.0	mg/l
Ammonia as N						
Summer	130.1	196.0	lbs/day	3.12	4.7	mg/l
Winter	249.0	354.5	lbs/day	5.97	8.5	mg/l
Phosphorus	41.7	------	lbs/day	1.0	----	mg/l

The limits for the increase in flow of 2 MGD based on the De minimis Lowering of Water Quality are:

	Quantity or Loading			Quality or Concentration		
Parameter	Monthly Average	Daily Maximum	Units	Monthly Average	Weekly Average	Units
$CBOD_5$	166.8	250.2	lbs/day	10.0	15.0	mg/l
TSS	166.8	250.2	lbs/day	10.0	15.0	mg/l
Ammonia as N	18.3	27.5	lbs/day	1.1	1.65	mg/l
Phosphorus	16.7	----	lbs/day	1.0	-----	mg/l

The final effluent limits for the increase of 5 to 7 MGD based on the De minimis Lowering of Water Quality are:

	Quantity or Loading			Quality or Concentration		
Parameter	Monthly Average	Daily Maximum	Units	Monthly Average	Weekly Average	Units
$CBOD_5$	1209.3	1918.2	lbs/day	20.7	32.9	mg/l
TSS	1417.8	2126.7	lbs/day	24.3	36.4	mg/l
Ammonia as N						
Summer	131.4	223.5	lbs/day	2.3	3.8	mg/l
Winter	267.3	382.0	lbs/day	4.6	6.5	mg/l
Phosphorus	58.4	----	lbs/day	1.0	-----	mg/l

If the discharger agrees to accept effluent limits that are less than or equal to these limits, the discharge will not be considered to be a significant lowering of water quality and no further action will be required.

If the discharger wants or needs to discharge any of these substances at a level that is greater than the limits based on the De minimis, then they must submit an antidegradation demonstration application unless the activity causing the new or increased discharge is considered by rule to not be a significant lowering of water quality.

If the activity causing the new or increased discharge is considered by rule to not be a significant lowering of water quality, then they must submit a Non-significant lowering of water quality application.